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PARAFFIN LAMP

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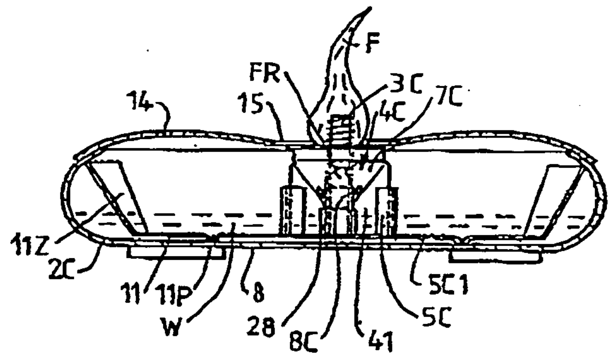
The invention concerns a lamp, in particular, a paraffin lamp, with a dish-like case (2C) in which a noncombustible wick (3C) is centered and which is held in an upright body (4C), through which fuel (W) filled into the case (2C) receives heat of fusion and the melt flows to the wick (3C), wherein the upright body (4C) consists of thin-walled metal and surrounds the wick (3C) on all sides in contact except for a narrow inlet gap and the upright body (4C) is designed as a cannula (28), with the wick (3C) being held projecting on the flame end, wherein the cannula (28) supports a funnel shoulder (7C) approximately 10-15 mm in height that projects over the wick (3C) far enough that with a full fuel supply the flame (F) extends at the lower end up to or into the funnel shoulder (7C), and there are funnel openings (8C) in the funnel shoulder (7C) in the region adjacent to the wick that furnish an air supply for a small residual flame (FR) burning

in the funnel shoulder (7C, 7D, 7E) during combustion of a fuel residue, so that the fuel decomposition residues present in the wick (3C) burn out.



The following data are known from the documents submitted by the applicant.

The invention according to the main application P 44 25 179.3 concerns a lamp, especially a paraffin lamp, with a dish-like case in which a noncombustible wick is centered and which is held in an upright body, through which the fuel filled into the case receives heat of fusion and the melt flows to the wick, wherein the upright body consists of thin-walled metal and is designed as a cannula in the lower region surrounding the wick on all sides in contact except for narrow inlet gaps with the wick projecting on the flame end, wherein the cannula is expanded on the flame end.

The purpose of the invention to disclose advantageous embodiments of the upright body with the wick such that it is simple to produce, and clogging of the wick capillary spaces in case of frequent refilling of the lamp is avoided.

The solution consists in the fact that the cannula carries a funnel shoulder which is approximately 10-15 mm in height and which projects far enough over the wick that, with a full fuel supply, the lower end of the flame extends to or somewhat into the funnel shoulder, and in that there are funnel openings in the funnel shoulder in the region down near the wick that are sufficient for an air supply for a small residual flame burning in the funnel shoulder during combustion of a fuel residue, and for burning out the wick.

Advantageous embodiments are given in the subclaims.

Formation of the upright body from thin-walled metal provides for rapid heating and liquefication of the congealed wax therein. The metal upright body conducts the heat of combustion rapidly and directly into the fuel, e.g., wax or paraffin. Molten wax is fed to the wick through a narrow inlet gap in the upright body by capillary action.

The heat-conducting plate, spaced slightly above the container bottom, holds the upright body and transfers absorbed heat to the fuel contained in the case, by which a continuous flow of wax is assured.

The heat-conducting plate located at the bottom of the case is advantageously designed as a holding plate to which the upright body can be attached, whereby the upright body is securely held even when the fuel is completely molten. In another embodiment the upright body is joined solidly with the heat-conducting plate through fastening tabs.

In a first embodiment the container is a flat iron dish with a diameter of 6-12 cm, preferably 9 cm. Iron is a good heat conductor, such that rapid melting of the fuel is possible after a relatively short time. The iron dish is advantageously closable with a cover with a flame opening, preferably a circular cover with a toroidal section, where a slight cooling of the container and the space over the fuel is assured by the cover. A closure cover that prevents the escape of wax vapor, especially in burning out the wick, is preferably provided for extinguishing the flame.

Due to the good heat distribution in the container, quite cheap paraffin granulate can be melted in it and the container can be large enough that despite the low bulk density of the granulate, three times the filling weight of a tea light can be introduced so that it is sufficient for a considerably longer burning time than is usually obtained with a tea light application. Even larger amounts of paraffin can be introduced in the form of pressed rings that gradually melt without soaking the wick.

A rapid melting process is supported by the use of a toroidal circular cover in that the heat is banked up in the upper region and the colder air flowing in centrally does not sweep over and does not cool the cover.

In a second embodiment the bowl-like container is a plastic dish with a diameter of 65-9 cm [sic: 5-10 is used later], preferably 7 cm, and a height of 15-25 cm, preferably 19 mm.

Through the use of plastic, the container is thermally insulated so that an even larger amount of fuel can be accommodated and melted in it than in the metal vessel. The plastic dish can be advantageously closed with a metal cover with a central flame opening.

The upright body is designed as a cannula of vertical segments in which the wick is held so that it projects on the flame end. The cannula is expanded in funnel fashion on the flame end, and has a vertical gap-like wax inlet slot. The upright body is preferably made of aluminum, copper or brass with a wall thickness of 0.15-0.25 mm, and has a height of 13-20 mm, preferably 16 mm. It is advantageously produced from a tube section or a stamped section by bending and folding.

The cannula is advantageously fitted loosely on the inside to the wick diameter. The funnel shoulder has an upper diameter of 10-18 mm, preferably 15 mm. The funnel cone

preferably has a cone angle of 60-120°. The wax inlet gap is located over the entire length of the cannula, and preferably continues as the air inlet opening in the funnel shoulder.

The upright body with the cannula facilitates rapid heating after ignition, and melting of the fuel in the upper wick region and then melting that propagates into the depth. The molten fuel passes into the cannula through the wax inlet gaps and is fed to the flame by capillary action in the wick. The funnel-like expansion on the flame end advantageously increases the heat exchange surface, and thus accelerates the melting process.

The upright body with the cannula can be advantageously designed so that it can be used in ordinary tea light holders. The fuel can be used in the form of circular pressed pieces with a central recess in the bottom into which the cannula with the funnel shoulder fits completely. A slight projection of wax whose narrower central hole permits the wick to pass through is bent down into the funnel shoulder and assures the fuel feed after the initial ignition after resupplying the lamp with fuel.

The wick consists of quartz glass fiber or a similar heat-resistant fiber material, so that it withstands many fillings without adverse effect, and it is stabilized against fraying either by pleating or by surrounding it with a metallic holding coil that preferably has a horizontal terminal winding at the upper end so that the sensitive quartz glass fiber material is not destroyed by contact.

When the wick burns empty, the residual flame dips further into the funnel shoulder. Finally, the wick begins to burn out so that the cracking residues that continuously arise during evaporation and gasification of the fuel and are deposited around the wick in the lower funnel region burn out completely, such that the capillary wick spaces become free.

The invention is described in the following on the basis of the illustrations in Figures 1-8:

Figure 1 shows a cross section of the paraffin lamp in a first embodiment.

Figure 2 shows a side view of the upright body according to Figure 1.

Figure 3 shows a top view without the upright body according to Figure 1.

Figure 4 shows a cross section of the paraffin lamp in a second embodiment.

Figure 5 shows a top view, with an upright body section, according to Figure 4.

Figure 6 shows a cross section of a lamp in a third embodiment.

Figure 7 shows a top view of the heat-conducting plate with the enlarged upright body according to Figure 6.

Figure 8 shows a pattern of the upright body in Figure 6.

Figure 1 shows a cross section of the paraffin lamp, in a first embodiment with an iron dish (2C). A noncombustible wick (3C) that is held in an upright body (4C) is centered in the iron dish. The upright body is dipped in meltable fuel (W).

A heat-conducting plate (11) of thin sheet metal and provided with through-flow holes is placed on the container bottom (8) slightly separated from it, and makes heat-conducting contact with the upright body (4C) and the fuel (W) filled into the iron dish (2C). The upright body (4C) is held on the heat-conducting plate (11) by support tabs (5C) bent up from openings (5C1).

The container bottom (8) is circular in this embodiment. The heat-conducting plate (11) is essentially circular and is supported with lateral support brackets (11Z) on the container (2C) in the vicinity of the inward-bent edge.

The heat-conducting plate (11) is designed as a holding plate, in that angular tabs (5C) from the openings (5C1) are raised to receive the ribs (41) formed on the upright body (4C). The heat-conducting plate (11) is provided with small foot-like spacer stampings (11P) bent downward so that a fuel feed gap remains at the container bottom (8) and the heat conveyed down does not transfer directly into the metal bottom, but sufficient fuel is melted only after ignition. Alternatively, a thermally insulating fabric between the heat-conducting plate and the container bottom can also serve as a spacer and fuel transporter.

The iron dish (2C) is flat and has a diameter of 6-12 cm, preferably 9 cm. The iron dish (20) can be closed with a cover (14) with a flame opening (15), an annular cover (14) with a toroidal section [being shown] in this representation.

As the fuel level drops, the flame is constantly supplied with liquid fuel (W) because the liquid fuel (W) is drawn into the wick (3C). After the flame is extinguished, the fuel (W) hardens rapidly so that sufficient fuel (W) is available in the wick (3C) when the flame is reignited.

The details of the design of the upright body (4C) are evident from Figure 2. A tube section approximately 15 mm in diameter is pressed together in the lower region from three sides to form three wing-like support ribs (41), wherein the cannula (28) is formed in the lower section with a height of approximately 5 mm and the wick (3C) is held in it. The funnel shoulder (7C) is formed over the cannula (28) between the three ribs (41). The inlet air openings (8C) approximately 1-1.5 mm in diameter are punched or cut free and pressed in or drilled in the lower region of it. The inlet gap (FC) for the fuel is formed in the support ribs (41), which are pressed together except for this gap.

The wick (3C) is produced of quartz glass fiber and surrounded with a wire coil (3H) of highly heat-resistant material with larger winding spacings than the wire diameter, and having a horizontal terminal winding (3W) on the end for protecting the wick (3C).

Figure 3 shows a view of the container (2C), in which the heat-conducting plate (11) is located. The three spacer stampings (11P) provide bottom spacing, and the three centering brackets (11Z) form a support for the upper container region. Support tabs (5C) are formed vertically from the heat-conducting plate (11) by bending out material from the openings (5C1).

The support tabs (5C) are stamped outward in a wedge-like manner so that they form suitable receivers for the support ribs of the upright body (4C).

Figure 4 shows a cross section of the paraffin lamp in a second embodiment. In this embodiment the bowl-like container (2D) is a metal or plastic dish with a diameter of 5-10 cm, preferably 7 cm, and a height of 15-25 mm, preferably 19 mm. A heat-conducting plate (11) is located in the container (2C) on the bottom side, and it is supported with centering tabs (11Z) at the top edge of the container (2D) on the one hand, and on the other hand is held slightly spaced away from the container bottom by a curved annular bead of the container (2R). The upright body (4D) is located on the heat-conducting bottom (11) in the middle; it is formed, from a sheet metal section, with a central ring (7R) and radial projections by stamping and folding. A cannula section (28) is formed in the middle of the upright body (4D) at the lower end; it is formed of sheet metal segments (7S) with gaps between them. The sheet metal segments are spread out from each other on the heat-conducting plate (11) to form support tabs (40D), and are fixed there with support brackets (5D) that are cut free. The middle zone of the upright body (4D) represents the funnel shoulder (7D) and is formed of an annular region, to which the broad tabs (7F) bent upwards, with gaps between them, connect. The air inlet openings (8D) of the funnel (7D) are made in the region of the transition from the cannula segments to the conical region. The wick (3D) has a tube-like jacket plaited of quartz glass fiber, and an absorbent core of quartz glass fibers.

Figure 5 shows the dish (2D) in top view, and the heat-conducting plate (11) fastened in it with the centering brackets (11Z). The still-unfolded sheet metal section, from which the upright body (4D) is prepared, is designated in the middle of the dish. The funnel zone is formed of the annular zone (7R) and continues upward with the broad extensions (7F). The narrow strips (7S) are bent laterally on the funnel and brought to the cannula segments. The end sections are spread out on the heat-conducting plate (11) and fixed there by support tabs (5D) bent out of the stampings (5D1).

Figure 6 shows a cross section of a third embodiment of the lamp. The dish (2E) has a height up to the cover that is greater than the height of the upright body. A reserve space for fuel (W) is thus created, especially on the edge side. Loaded with a paraffin disk (P), the space can be utilized to its full height, in which case a middle hole that is larger than the upper diameter of the funnel shoulder (7E) is provided in the fuel disk (P). A paraffin projection (PA1) extends downward into the funnel shoulder (7E).

The thickness of the paraffin disk (P) is less than the height of the upright body, so that refilling can be effected prior to complete burnout of the container. A complete burning out is required now and then, so that the wick is burned free of residues.

Instead of [being put] in a dish of the broad and laterally curved form shown, the upright body and a correspondingly dimensioned annular paraffin piece can also be introduced into a tea light housing with a cylindrical shape and conventional dimensions of, e.g., 38 mm in diameter and 19 mm in height.

The upright body (4E) has a cannula (28) that is folded together of three segments. It is located in a tea light-like container (2E). The metal upright body (4E) is formed of a sheet metal section (Figure 8). The wick (3E) is held in a projecting manner in the cannula (28). The cannula (28) is expanded funnel-like from an annular zone on the flame end. Gap-like vertical wax inlet gaps (FE) are located between the cannula segments, a side edge of which is visible. These gaps (FE) extend down into the bottom zone of the funnel shoulder (7E) and are expanded there as funnel openings (8E) for supplying the residual flame (FR), shown in dashed lines. The upright body (4E) is of copper or brass with a wall thickness (WS) of 0.15-0.25 mm, and has a height of 13-20 mm, preferably 16 mm. The cannula (28) has an internal diameter of 1-5 mm, preferably 2.5 mm, which corresponds to a loose fit with the wick diameter.

The funnel shoulder (7E) on the flame end serves as the heat-exchange surface that absorbs the heat of radiation, and the cannula (28) conveys the wax into the vicinity of the wick, especially soon after the flame is ignited. The liquefied fuel flows through the wax inlet gap (FE) into the cannula (28), and rises through the wick. The fuel is also conveyed in the cannula (28) to the wick (3E) and the flame. The wick consists of a plaited quartz glass fiber jacket with an absorbent quartz glass fiber core.

Figure 7 shows an enlarged top view of the heat-conducting plate (11) that is held spaced away from the bottom by stampings (11P). The upright body (4E) is fastened in the center in that it is held with support tabs (40E) in the bottom-side openings (5E1) of the heat-conducting plate (11). The region of the cannula (28E) is folded together of three segments, on which lateral support brackets (41E) are folded and from which the holding tabs (40E) extend angularly on the bottom side. There are small inlet gaps (FE) between the cannula segments (28E).

Figure 8 shows a stamped section of thin sheet that is shaped by a stamping process in the region of the three cannula segments (28K) and the funnel shoulder (7E) and then is folded along the dashed and dot-dash lines so that when completely folded the intermediate sections (28Z) lie outside the funnel shoulder (7E) and the funnel openings and the inlet gaps result. Radial support brackets (41E) thus result laterally on the cannula segments (28K), and holding tabs (40E) are formed thereon, which also serve to effect heat distribution and fastening to the heat-conducting plate.

The lamps described can also be operated with wax or stearine or with combustible vegetable fat.

Claims

1. Lamp (1C,1D,1E), especially a paraffin lamp, with a dish-like container (2C,2D,2E), in which a noncombustible wick (3C,3D,3E) is centered and which is held in an upright body (4C,4D,4E) through which the fuel (W) filled into the container (2C,2D,2E) receives heat of fusion and the melt flows to the wick (3C,3D,3E), wherein the upright body (4C,4D,4E) consists of thin-walled metal and is designed as a cannula (28) in the lower region, surrounding the wick (3C,3D,3E) on all sides in contact, with the exception of narrow inlet gaps (FC,FD,FE), with [the wick] projecting out on the flame end, wherein the cannula (28) is expanded on the flame end, characterized in that the cannula (28) carries an approximately 10-15 mm high funnel shoulder (7C,7D,7E), that projects far enough beyond the wick (3C,3D,3E) that with a full fuel supply the flame (F) extends at the lower end up to or somewhat into the funnel shoulder (7C,7D,7E), and in that there are funnel openings (8C,8D,8E) in the funnel shoulder (7C,7D,7E) down in the region near the wick which are sufficient for the air supply for a small residual flame (FR) burning in the funnel shoulder (7C,7D,7E) for burning the residual fuel, and for burnout of the wick.

2. Lamp according to Claim 1, characterized in that the upright body (4C,4D,4E) is made of metal, especially light metal, copper or brass, with a wall thickness of 0.15-0.25 mm, [and that] the cannula (28) has a height of approximately 5 mm and an internal diameter that corresponds to a loose fit with the wick diameter.

3. Lamp according to one of Claims 1 or 2, characterized in that the cannulas (28,28E) and their funnel shoulders (7D,7E) and their support tabs (40D,40E) are folded together from a stamped part.

4. Lamp according to Claim 3, characterized in that the stamped part is prepared from a blank that has a central ring for the formation of the funnel shoulder (7E,7R) and radial webs (28Z,28K;7S) that run parallel to the funnel shoulder and are designed as cannula segments (28K,7S) and a shaped holding tab (40D) or a support bracket (41E) on which a holding tab (40E) is formed.

5. Lamp according to one of Claims 3 or 4, characterized in that the inlet gap (FD,FE) extends over the entire length of the cannula (28) between the cannula segments and is designed in continuation as a funnel opening (8D,8E).

6. Lamp according to Claim 5, characterized in that bracket-like extensions (7F) extending upward are formed on the central ring of the funnel shoulder (7D).

7. Lamp according to one of Claims 1 or 2, characterized in that the upright body (4C) consists of a tube section with the formation by pressing in of radial support webs (41) and of cannula segments (28) as well as of the funnel shoulder (7C), and the support webs (41) have

separated walls leaving the inlet gap (FC), and the funnel openings (8C) are stamped in, cut free and pressed in or drilled.

8. Lamp according to one of the preceding claims, characterized in that the upright body (4C,4D,4E) is held on a heat-conducting plate (11) of thin sheet metal by tabs or brackets (5C,5D,5E) bent out of it, and the heat-conducting plate (11) is held slightly spaced away from the container bottom (8) by a heat insulating intermediate layer or by spacer stampings (11P) in the heating plate (11) or a supporting edge (2R) on the container (2D).

9. Lamp according to Claim 8, characterized in that the heat-conducting plate (11) is essentially circular and carries centering tabs (11Z) on the side that are supported at their ends on the container (2C,2D,2E) near its curved-in edge.

10. Lamp according to one of the preceding claims, characterized in that the container (2C,2E) is essentially covered with a lid (14) with a flame opening (15), preferably an annular cover (14) with a toroidal section, and is completely closable with an extinguishing cap.

11. Lamp according to one of the preceding claims, characterized in that the wick (3C,3D,3E) consists of a heat-resistant fiber material, e.g., quartz glass fibers.

12. Lamp according to Claim 11, characterized in that the wick (3C) is sheathed with a metal wire coil (3H) or a plaited quartz glass tube.

13. Lamp according to Claim 12, characterized in that the wire coil (3C) has a closed winding (3W) at the top end on the wick (3C).

14. Lamp according to one of the preceding claims, characterized in that it is a tea light, in particular, with commercial dimensions, that is filled with an annular paraffin piece (P) having a central hole on its bottom side somewhat wider than the diameter of the funnel shoulder (7E), and having paraffin projection (PA1) a few millimeters wide extending into the latter, leaving a wick passage hole countersunk in a funnel-like form, and having a thickness that is less than the height of the upright body (4E).

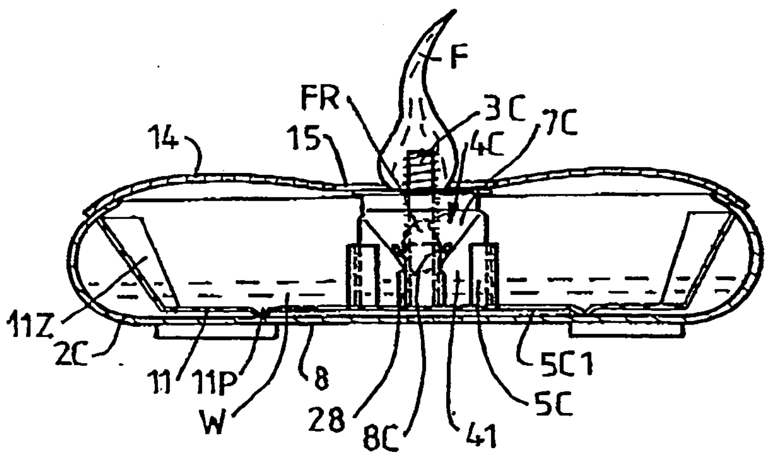


Fig. 1

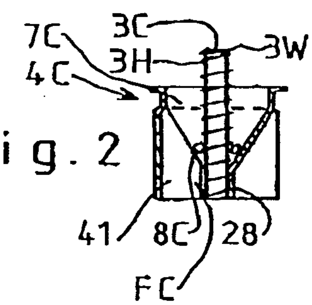


Fig. 2

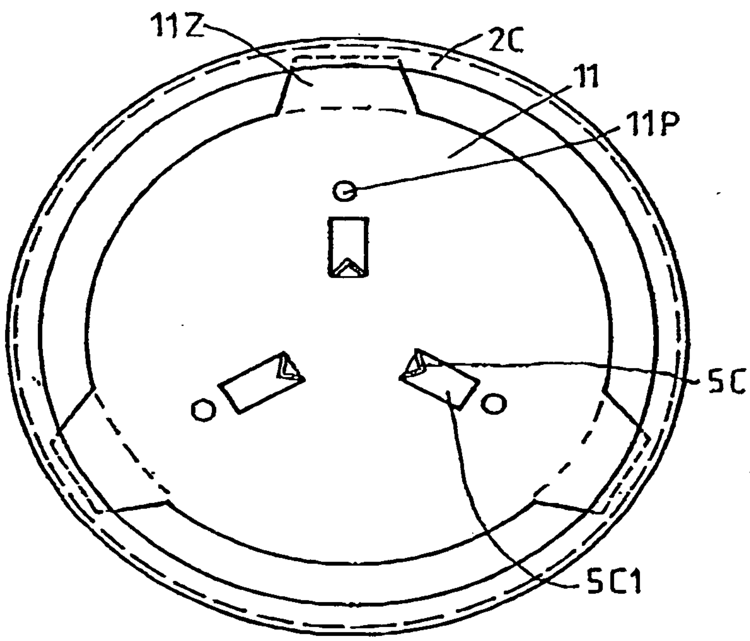


Fig. 3

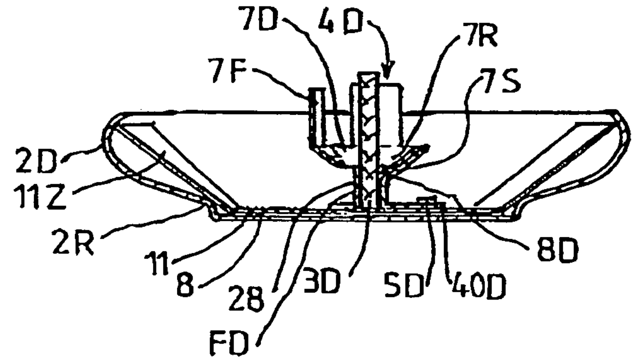


Fig. 4

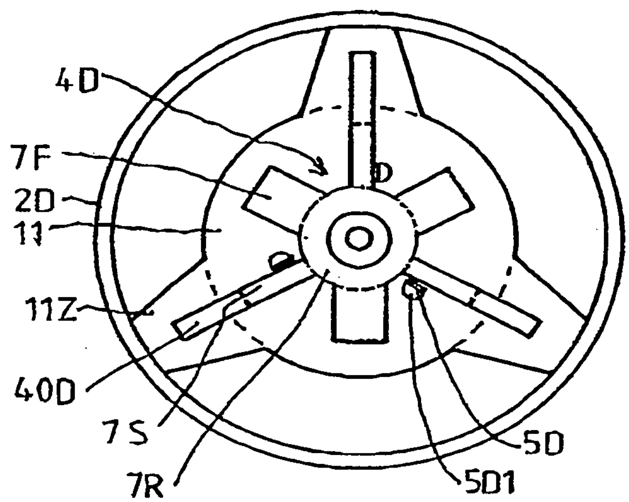


Fig. 5

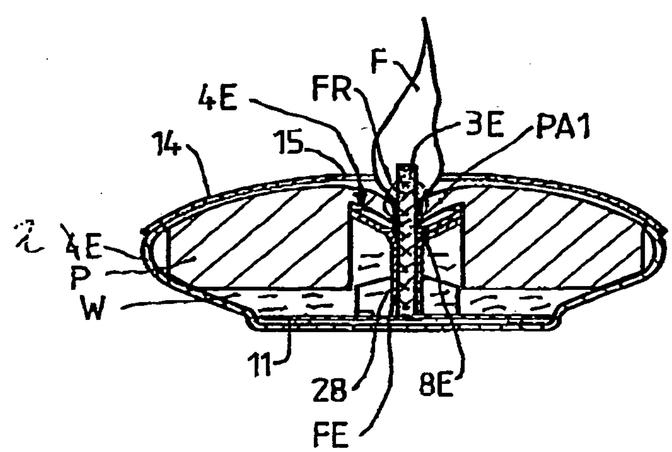


Fig. 6

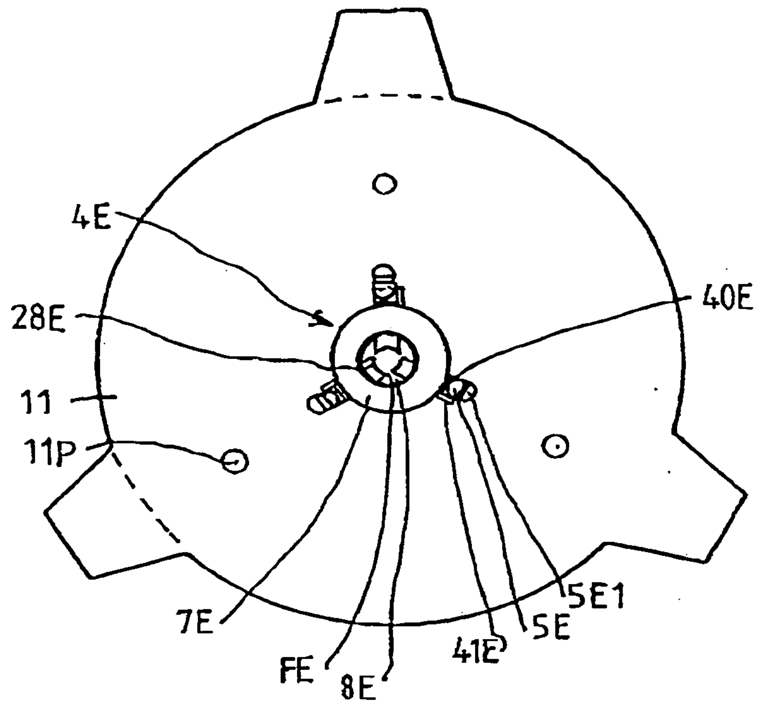


Fig. 7

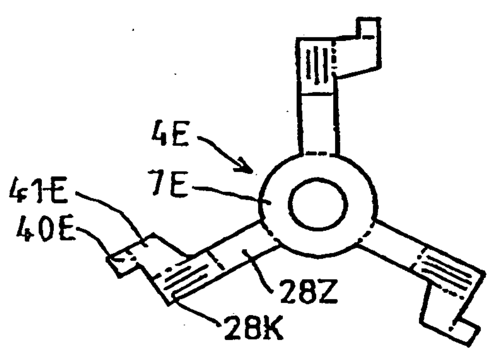


Fig. 8